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PROBLEMS RELATING TO THE IMMUNISATION OF CATTLE AGAINST *BR. ABORTUS**

A. D. McEWEN,

VETERINARY DEPARTMENT, SOUTH-EASTERN AGRICULTURAL COLLEGE, WYE, KENT

A few years ago vaccination against *Br. abortus* infection was unpopular. Vaccines consisting of dead organisms were regarded as valueless and it was generally believed that live vaccines did not confer a satisfactory protection against infection; furthermore, live vaccines were condemned because some animals were infected by vaccination and excreted the vaccine strain in their milk.

During the past decade the policy of attempting to control the disease by the removal of infected animals from herds gained in popularity and reached its peak in the eradication and slaughter policy of the United States of America, where in the period from July, 1934, to May, 1939, 1,809,551 cattle were regarded as infected and were slaughtered.

Cotton (1940), who was formerly the Director of the United States Bureau of Animal Industry Experiment Station, remarking on this slaughter, says sadly: "It is hoped that more effective and much less expensive means of handling the disease will eventually be found, but until then it is our duty to make the best use of the knowledge and tools we have." To-day I believe we are acquiring knowledge on immunity that brings Cotton's hope nearer to realisation and we are grateful to him and to other American workers, particularly Huddleson and Buck, for the stimulus their work has given to a revived interest in immunisation.

Studies on the immunisation of cattle pivot on two facts. The first is that the susceptibility of female cattle varies at different periods of their life, calves being less susceptible than older animals and pregnancy greatly increases susceptibility; the second is that laboratory strains of *Br. abortus* may vary in virulence. Taking advantage of these facts experiments have been designed to try and find methods of immunising cattle without infecting them.

Let us consider some experiments by Cotton, Buck and Smith reported in 1934 where the immunity of cattle vaccinated with strains of different degrees of virulence was studied. The results of these experiments are summarised by me in Table I (*overleaf*).

The experiments show that strains of low virulence do not immunise so effectively as strains possessing moderate or high virulence, and this can now be accepted as proven.

Comment may be made on certain matters in the report on these experiments because a live vaccine prepared from Strain 19 is now being used to a considerable extent in the United States; it has also been used in other countries, and it is probable that consideration will be given to its use in this island.

1. At the time of the first experiment the virulence of the vaccine strains was estimated by inoculating each of the strains into 18 guinea-pigs; two months later the animals were killed; any macroscopic lesions were noted and the sera were tested for agglutinins. Only a very rough and ready guide to the virulence of strains can be obtained from such tests. The macroscopic lesions produced by Strain 11 indicated that it was more virulent than Strain 19, but in a former experiment (Cotton and Buck, 1933) a comparable test had given the reverse indications.

In both experiments of the present series the same strain, 1531, was used to test the immunity of the cattle, and it is reported that when the cattle in the second experiment were infected, the strain was inoculated into nine guinea-pigs that were killed two months later, but "contrary to expectations they had developed only slight abortion disease lesions. It was feared, therefore, that the *Br. abortus* exposure of the cattle had not been sufficiently severe. This, however, proved not to be the case, as a high percentage of the control cattle acquired the disease and aborted." This result demonstrates the very imperfect indication of virulence given by relying on the macroscopic lesions produced in inoculated guinea-pigs.

It is now known that rough strains of *Br. abortus* that produce no demonstrable serum agglutinins may be more virulent than smooth strains that stimulate agglutinins. Therefore unless it be shown that the strains tested are smooth and contain no trace of roughness, the titre of agglutinins is no indication of virulence. Furthermore, it has not been proved even with smooth strains that comparatively small variations in virulence are reflected by the titre of the serum of inoculated animals.

2. Apparently no special precautions were taken to preserve the vaccine strains so that their characters were not altered. The authors were fully alive to the possibility that the strains might have altered, because

* Paper read before the Section of Pathology, Royal Society of Medicine.

Table I

Degree of Virulence of Vaccine.	Vaccine Strain.	Heifers.	Cows.	Aborted and Infected.	Aborted but not Infected.	Calved but Uterus Infected.	Infected in Udder only.	Total. Infected.
Experiment 1								
Low	801	4	—	1	—	—	2	3
„	802	4	—	1	—	1	—	2
Medium ...	11	2	1	—	—	1	1 (cow)	2
„ ...	19	4	2	1 (heifer)	1	—	—	1
	Controls	8	—	8	—	—	—	8
Experiment 2								
Low	801	11	—	8	—	1	—	9
Medium ...	19	9	—	—	2	—	—	0
High	618	6	—	—	—	—	1	1
	Controls	11	—	7	—	—	—	7

In both experiments the animals were infected with Strain 1531. Twenty-one months elapsed between the vaccination of animals in Experiment 1 and the vaccination of animals in Experiment 2.

they remark that during the 21 months between the Experiments 1 and 2, Strain 801 may have lost in "immunising power."

3. In the second experiment the vaccine strain 618 and the infection strain 1531 were both virulent and no doubt aerobic, therefore it was impossible to tell whether the animal vaccinated with 618 and found infected was infected with the vaccine strain or with Strain 1531. Similarly, in the first experiment, there is no proof that the cattle vaccinated with Strains 11 and 19 and found infected were not actually infected by these strains. These criticisms may be summarised as follows :—

1. The estimations of virulence were inadequate.
2. No precautions were taken to prevent deterioration of the vaccine strains.
3. No proof was furnished to show that the vaccinated animals that were infected were not infected with the vaccine strain.

The reports on all of the controlled immunisation studies on Strain 19 that I have read are equally open to the criticisms levelled against these particular experiments by Cotton, Buck and Smith. These criticisms should be met before concluding that the use of vaccine prepared from Strain 19 is established on a sound experimental basis.

Time does not permit a review of the experiments on Strain 19 which was isolated in 1923 and is now being used increasingly for the vaccination of calves. It should, however, be noted that although the strain is said to be of low virulence it appears to have infected non-pregnant cows and also heifers. Animals vaccinated with this strain have developed a satisfactory immunity but no information has been given on any methods for maintaining and checking the virulence and immunising properties of the strain. We therefore do not know whether the strain is of the same value to-day as it was a year or 15 years ago. Recently Mohler (1940), the Chief of the Bureau of Animal Industry in the United States of America, outlined in the lay press the general proposals of a plan for the control of contagious abortion which included calfhood vaccination as an adjunct to the test and slaughter policy. Although Strain 19 is not specifically mentioned in this plan there is little doubt it would be used for the preparation of the vaccine. It is therefore of interest to note the number of critical experiments on calves vaccinated with Strain 19. As far as I can ascertain these are :—Buck (1930), 3 calves ; Cotton, Buck and Smith (1934), 9 calves ; Haring and Traum (1937), 4 calves ; Buck, Cotton and Smith (1938), 2 calves ; Mohler (1938), 4 calves ; Delez (1940), 9 calves. Altogether 31 calves have been vaccinated and later, during pregnancy, experimentally infected. The immunity of 18 of these animals was tested at the first pregnancy and the immunity of the remaining 13 was tested when the animals were pregnant for the second time.

In none of the experiments is there any evidence that animals vaccinated as calves develop a resistance to infection superior to that of animals vaccinated later in life. Certainly animals vaccinated as calves are less likely to be permanently infected by the vaccine strain than are older animals, and this may have given rise to the opinion sometimes expressed, but which has no experimental data whatsoever to support it, that a young calf develops a better immunity than an older animal.

It has been too generally accepted that the immunity acquired by the calf is relatively permanent and that it will afford the animal protection for two or more pregnancies. This impression was probably based on limited tests, where animals vaccinated as calves were exposed to artificial infection during their first pregnancy and later resisted a further exposure during a second pregnancy. Experiments of this nature, however, afford no evidence of the independent persistence of the immunity acquired as a calf, because it is a probability, if not a certainty, that the original immunity was reinforced by the exposure to infection during the first pregnancy. There are two critical experiments on the persistence of immunity into the second pregnancy. Mohler (1938) reported on four calves that were vaccinated with Strain 19 and were not exposed to infection until during their second pregnancy. Three of them calved normally and were not infected, but the fourth gave birth to a weak calf and was infected in both the

uterus and the udder. Four control animals aborted and were shown to be infected. Delez (1940) vaccinated calves and kept them from exposure to infection until they were pregnant for the second time. The infective dose they were then given does not appear to have been excessive. Nevertheless, out of nine animals vaccinated as calves three calved prematurely and altogether four were found to be infected. Four controls were used and they all aborted. Bacteriological examinations were made on only three of them, but they were all found to be infected. These experiments, although they show that immunity is still present, nevertheless suggest that the immunity may have declined by the time an animal vaccinated as a calf is pregnant a second time.

The reasons why the vaccination of calves is being popularised in the United States of America may be summarised as follows :—

1. Some resistance to infection is produced.

2. Few animals are permanently infected with the vaccine and by the time the animals have calved the majority will show either no serum agglutinins or agglutinins at low titre only.

3. The method of vaccination is compatible with the policy of slaughtering adult cattle that are positive reactors to the agglutination test.

4. No other method of immunisation that did not interfere with the test and slaughter policy appeared to be available.

These criticisms of calfhood vaccination with Strain 19 do not infer that the method is not of value. All the evidence from small controlled experiments and from field trials suggests that it is of value, but the mere fact that the method has fitted in with the test and slaughter policy of the United States should not be allowed to exaggerate its value.

If work on the immunisation of cattle with live vaccines is necessary certain essential matters should be given attention.

1. No vaccine should be used that will infect the type of animal it is intended for. It follows that every vaccine, before it is used in the field, should be tested for infectivity on a sufficient number of experimental cattle.

2. The immunising properties of any vaccine should be proved on a sufficient number of cattle before the vaccine is used generally in the field.

3. Vaccination should not cause animals to react to the agglutination test. Attention should therefore be given to the use of vaccines prepared from rough strains of *Br. abortus* that do not stimulate demonstrable agglutinins in inoculated animals. It has been shown that, contrary to the general rule, the serological characters of *Br. abortus* are of no significance immunologically and rough strains confer protection as effectively as smooth strains.

4. The characters of strains used for the preparation of vaccine and of strains used for testing the immunity of vaccinated animals should be maintained constant. Preservation of *Br. abortus in vacuo* has maintained the most labile of all characters, namely, CO_2 sensitivity, as well as virulence and serological specificity, for several years without deterioration.

5. Experiments have shown that laboratory animals afford a reliable guide to the immunising properties of strains of *Br. abortus* for cattle. Full use should therefore be made of small animals for testing the properties of vaccines from time to time. Groups of these animals may also be used effectively for tests to ensure that the virulence of vaccine strains is maintained at a constant level.

6. To avoid a mistaken interpretation of the results of vaccination in the field the epizootiology of the disease as it is affected by herd management must be taken into consideration. In the majority of milk-producing herds with which I am familiar the calves and heifers seldom come in contact with the cows until the heifers have had their first calf, and very few of these young animals are infected until after they have had their first calf and joined the milking herd. In such herds animals vaccinated as calves or heifers will not have their immunity put to the test until they are pregnant for the second time. These herds do not appear to be suitable for calfhood vaccination unless this is reinforced by further vaccinations carried out later in life.

When the older cattle that are non-reactors to the agglutination test are vaccinated it is certain that some of the animals are infected although non-reactors. The disease will run its natural course in these cattle despite vaccination and some will abort. This must be taken into consideration when trying to assess the value of vaccination. In the majority of herds the truest picture will be obtained from those vaccinated animals that, after having been first vaccinated, have passed through one pregnancy without showing evidence of infection and observing their behaviour during the second and subsequent pregnancies, provided the animals are still exposed to the risks of infection. It follows that a correct assessment of field trials cannot be collected from any herd unless that herd is carefully followed for two years at the very minimum.

If the routine immunisation of cattle is ever to be lifted from its present state of chaos in which cattle are inoculated with this and that strain of *Br. abortus* about which too often little or nothing is known, all the foregoing points will have to receive careful attention. It is to be hoped that in the future the preparation of vaccines will be under the direct charge of persons who will appreciate the responsibilities of their duties and who will realise that we are still on the threshold of knowledge regarding immunity to *Brucella*, also that sufficient energy and resources will be expended to enrich the knowledge on this important veterinary problem.

I trust that a more sensible outlook will become general on the use of experimental animals, particularly cattle. There is now sufficient knowledge to justify the use of cattle on a greatly extended scale, an experimental scale more in keeping with the importance of the disease in the field.

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Food Poisoning*

W. N. M. MASON, M.D., M.R.C.S., D.P.H.,
Deputy Medical Officer of Health, Plymouth

The term "food poisoning" is often loosely applied to include a great variety of conditions arising from the consumption of naturally poisonous substances such as deadly nightshade, toadstools, ergot, or from food or drink accidentally poisoned by arsenic or metals. Certain foods, particularly milk, may also be the vehicle for the carrying of germs of scarlet fever, undulant fever, septic sore throat and tuberculosis, while some types of fish have the property of occasionally causing urticarial rashes in some of its allergic consumers.

True food poisoning, however, can be defined as an acute gastro-intestinal illness caused by the ingestion of food contaminated by a certain group of bacteria or their products. It may readily be imagined how easily an outbreak of bacterial food poisoning may assume epidemic proportions, as one infected person or carrier may easily pass on the illness to many others. Hence the wise decision to make food poisoning a notifiable disease.

In recent years the great advances made in bacteriology have made possible the identification and classification of the organisms recovered from sufferers in outbreaks of food poisoning, and now a group of bacteria named the Salmonella, after the worker who made some of the earliest discoveries, are known as the food poisoning organisms. Nearly all these germs are carried by animals, many of them animals whose meat we use for food, and cause illnesses of the gastro-intestinal type in the affected animal. These illnesses may be severe, but frequently are so slight that the condition is unrecognised in life, and the meat is passed as sound as it undoubtedly looks. This is a very different view from that taken in the past, when food poisoning was postulated as usually being caused by the ingestion of putrefying food and the condition labelled "ptomaine poisoning." The mechanism of the poisoning was supposed to be the formation of toxic amines or ptomaines in decomposing protein. Experiments have proved that toxic amines are never present except in food so decomposed as to be very repulsive, and therefore obviously not eaten. Experiments have also proved that the food poisoning organisms, under certain circumstances, may form toxins which persist after the bacteria themselves have been killed by heat. These toxins may give rise to symptoms of food poisoning without any putrefactive changes taking place in the affected food, and without the presence of the bacteria themselves.

The contamination of food by food poisoning organisms, as distinct from infection of the animal in life, may be brought about by uncleanly handling of the food by an infected person, or by contamination by the excretions of animals. Rats and mice are very frequent carriers of disease-causing germs, and an examination made in Liverpool of 250 apparently healthy rats, showed 17·6 per cent. of them to be carriers of food-poisoning organisms.

Other bacteria causing illnesses of a gastro-intestinal type which are frequently incriminated as causing food-poisoning outbreaks are the typhoid, paratyphoid and dysentery organisms. The relationship of these organisms to the Salmonella is very close, and although they are regarded as strict pathogens of man, paratyphoid B. has been isolated from the mesenteric glands of apparently healthy pigs.

* Paper read at a Sessional Meeting of the Royal Sanitary Institute held at Plymouth, May 25th, 1940. Reproduced from the January, 1941, issue of the *Journal of the Royal Sanitary Institute* (61. 69-74).

A brief classification of the organisms frequently incriminated in food poisoning outbreaks is given to compare the mode in which the food becomes infected. Actually about 40 types of food poisoning organisms have been described, but for brevity only the most frequently occurring ones are included.

Animals Infected in Life.	Food Contaminated.	
	By Rats and Mice.	By Man.
Fresh Meat. Cattle. *Bact. enteritidis.* Pigs. *Bact. cholerae-suis.* Ducks. *Bact. enteritidis.* Duck eggs. *Bact. typhi murium.* Made-up Meats. These organisms or their toxins.	*Bact. typhi murium.* Any foodstuffs to which these vermin have access.	*Bact. typhosum.* *Bact. paratyphoid* A and B. *Bact. flexneri.* *Bact. sonnei.* Handling of foods by carriers or contamination by sewage.

There is another type of poisoning, very rare in this country, which must be considered, and that is botulism. This is not an infection, but an intoxication by the very powerful toxins produced by *Cl. botulinum*. These toxins are only produced under certain circumstances, such as heating to exactly the correct temperature. This explains why, although the organism is very common in nature, cases of poisoning are rare. The symptomatology of botulism is very different from food poisoning in that the predominant features are sudden collapse with nerve paralysis, muscular weakness, and absence of pyrexia. The foods responsible have always been heated, reheated, or tinned.

The comparative frequency of the various causes of food poisoning outbreaks is shown by the results obtained in the investigation of 100 outbreaks reported by the Medical Research Council:—

Outbreaks probably not true food poisoning ...	3
Outbreaks due to members of the Salmonella group	66
Outbreaks due to members of the dysentery group	4
Outbreaks due to *Cl. botulinus*	1
Outbreaks due to chemical origin	2
Cheese-poisoning outbreaks	8
Mild evanescent outbreaks	9
Outbreaks of undetected bacterial origin... ...	7

The enormous preponderance of Salmonella infection is well known. It was thought probable that the cheese-poisoning outbreaks referred to were caused by Salmonella toxins.

The variety of foodstuffs incriminated in various outbreaks is large, but certain articles are found more frequently to be the cause than others. Meats, veals, pork, etc., are more often causative agents when made up into brawns, patties, sausages, jellies or pies. It is obvious, of course, that this increases the chance of outside contamination. Imported turkeys, duck eggs, shellfish, cheese and tinned foods are less frequently incriminated. It is important to emphasise that the foodstuff may appear perfect, and to illustrate this there is the authentic story of the Belgian meat inspector who was asked to pass an opinion on some suspected sausages. After careful inspection the man pronounced the food excellent, and deciding that deeds

spoke louder than words he ate some himself with great relish. In five days he was dead, as were some other consumers of the same food, and *Bact. enteritidis* was isolated from himself as well as the sausages.

The clinical picture in cases of food poisoning, excepting botulism, is markedly uniform. The three cardinal features are abdominal pain, vomiting and diarrhoea. The varying feature is the incubation period. In cases caused by bacterial toxins the period is short, and usually the symptoms pass off quickly. In infection with bacteria the illness runs a course typhoid in form but not usually as severe. The mortality rate varies, but is usually low, about 1 to 2 per cent. In botulism the condition is usually fatal.

The method of investigation of outbreaks of food poisoning is of great practical importance. There are five main points of procedure :—

(1) To secure a complete list of cases.
(2) To obtain particulars of individual cases.
(3) To ascertain the vehicle of infection.
(4) To study the history of the implicated food.
(5) To search for evidence pointing to the source of infection of the food.

(1) A complete list of cases is now easier to compile since the condition is now notifiable, but the careful questioning of members of the affected household will frequently give rise to fresh avenues of investigation and the probable discovery of fresh cases.

(2) In obtaining particulars of individual cases, uniformity of interrogation is important. [In this connection the author inserts a copy of the card used in Plymouth.]

(3) To ascertain the vehicle of infection is a very difficult problem, but what concerns us is the selection of the most likely articles to submit to the bacteriologist or possibly the analyst, with which specialists the ultimate decision rests. The sufferers will probably be quite certain in their own minds of the particular food that caused the trouble, because " it tasted bad " ; this decision is very frequently wrong, and other likely articles of food should also be collected for examination. The purveyor of the food is a biased source of information, and should only in special circumstances be immediately approached, as food poisoning is a frequent source of litigation. Also under this heading comes the collection of samples from the patient. It is most important that vomit and faeces be submitted to the bacteriologist at the earliest opportunity. The doctor may make blood tests later on.

(4) The history of the suspected food will frequently show that it has been " processed " in some way, leading to its contamination.

(5) The evidence which may point to the source of the infection of the food may be the detection of a carrier, the origin of the foodstuff, such as emergency slaughter, or the presence of vermin.

To close this paper I should like to give some examples of food-poisoning outbreaks.

Firstly, a very simple case that occurred in Liverpool. The mother of a ten-months-old baby reported that the child was thriving on a particular brand of dried milk until the lid was used for some other purpose than closing the tin. The infant then developed diarrhoea and vomiting, which the mother attributed to the dried milk deteriorating on exposure to air. *Bact. typhi murium* was isolated from the faeces, and also from a sample of the dried milk. A trap was set in the larder and a mouse was caught, which proved on bacteriological examination to be a carrier of this food-poisoning organism. The conclusions are obvious.

The second example is drawn from an outbreak at Scunthorpe, in which the suspected food was brawn. Two households were involved, and also one person visiting one of the houses for a meal. In one household of seven, the five persons eating the brawn were taken ill, and in the other only three ate the brawn, and all were taken ill. The incubation period varied from 10 to 20 hours. The symptoms were nausea, diarrhoea, vomiting and pyrexia, and all patients recovered. Blood taken from each of the patients on recovery agglutinated suspensions of *Bact. enteritidis*.

The history of the brawn revealed that it was made from the unsold portions of recently slaughtered pigs, and that sausage casings were also prepared on the same premises as the brawn by a single worker. A considerable quantity of brawn was made at one time in separate containers, and the cooking facilities were such that not all the containers would receive the same amount of heat. It is most probable, therefore, that the portions of one pig used in the manufacture of the brawn were infected with *Bact. enteritidis* in life, and that in preparation insufficient heat was attained in one container to kill the bacteria.

The third example is the classical Loch Maree outbreak of botulism. In August, 1922, eight persons were taken ill at an hotel at Loch Maree. The symptoms were severe, commencing 19 to 24 hours after the meal, and all eight persons died. *Cl. botulinum* was isolated from a jar of duck paste, from which sandwiches had been made and had been eaten only by the sufferers. The duck paste had been prepared some time before at a London factory, and appeared perfectly wholesome. No other samples of the same brand were found to be similarly affected.

I have purposely omitted from this paper the prevention of outbreaks of food poisoning. This subject is entirely bound up with the supervision of food supplies, which will be thoroughly dealt with in Mr. Sanderson's paper. [This follows in the same issue of the *R.S.I. Journal.—Editor, V.R.*]

WASTE FOR ANIMAL FEEDING

The Minister of Agriculture told the House of Commons recently that the amount of waste available for animal feeding was very difficult to estimate; but that, from sample tests carried out, the Ministry of Supply believed it would be between 450,000 tons and 500,000 tons a year. Of that quantity between 110,000 and 120,000 tons was already being collected by local authorities and sold to farmers, whilst other 60,000 to 70,000 tons were being collected by contractors and by farmers themselves. Besides, there was now a large number of pig clubs, and individual pig-keepers, who kept probably between 30,000 and 40,000 pigs very largely on waste food; and then there was the food consumed by 15,000,000 hens belonging to nearly 800,000 backyarders and small producers. When they deducted the whole of the waste food already being utilised from the total available supplies, it was probable that only something of the order of 100,000 tons were still available for collection. They were taking steps with the Ministry of Supply to get that amount in, but even if the whole of it were collected it would not allow them to keep more than another 150,000 pigs. In any case, he added, with increased strictness of food rationing, the amount of swill and especially the feeding value of swill, would be likely to diminish steadily.

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A Clydesdale gelding auctioned in Glasgow by Lord Provost Sir Patrick Dollan, in aid of the Clydeside Air Raids Distress Fund, realised £560. The horse was presented by Mr. Isaac Barrie, contractor, and was bought by another Glasgow contractor.

CLINICAL COMMUNICATION

Primary Uterine Inertia in a Heifer

E. G. E. PETERS, M.R.C.V.S.,
Ryde.

The subject was a 2½-year-old, primigravid, X-Guernsey heifer.

She was first seen by Mr. J. C. Blake, M.R.C.V.S., on March 20th, 1940, when she was one day overdue. For three days she had had a very full and tender udder and swollen vulva, as if parturition were imminent, but she had not strained at all. The cervix was closed. She was given a dose of pituitary extract.

I first saw her next morning, March 21st. The cervix was then dilated, and two fore legs were felt at the pelvic inlet in intact membranes. *Per rectum* the head could be felt further back in a normal position. The calf, which was alive, was removed by careful traction on the legs and head, the cow giving practically no assistance.

She cleansed during the night and gave no trouble in getting in calf again.

On March 10th, 1941, the cow was 10 days overdue at her second calving. Her udder and vulva had been swollen for the past 10 days, as last year, but again no straining had occurred. The cervix was completely closed. She was given 5 c.c. of pituitary extract subcutaneously. Next day the cervix was half open, allowing the passage of two fingers. It was stimulated by manipulation, which also produced further dilatation A second dose of pituitary was given. Calving took place, without assistance, 3 to 3½ hours afterwards, the calf being alive.

Observations.—In each case the inertia was complete, in that the os did not even dilate, although all the outward signs of imminent parturition had been present for some days. Pituitary caused the os to dilate, but until that had been achieved did not promote uterine contractions, and there was no uterine haemorrhage such as normally occurs if this agent is given before parturition commences. The calf was normally presented, not oversize, and alive.

I am looking forward to her next calving with interest, as, since she is a good milker, it is unlikely that she will be sold.

FOODSTUFFS RATIONING AND MILK YIELD REDUCTION

At the annual meeting of the Yorkshire Milk Recording Society the Secretary, Mr. A. P. Seery, averred that owing to the reduced supply of feeding-stuffs the average yield per cow fell by 150 gallons during the past year. Milk producers in the future would have, as far as possible, to make themselves self-supporting so far as foodstuffs were concerned.

The number of herds recorded last year was 85, the highest yield (2,037 gallons) being given by a British Friesian belonging to Mr. B. Parkinson, of Arthington.

The county milk recording scheme is to be continued.

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The special medal for bravery has been awarded by Our Dumb Friends League to Mr. John Mudge and Mr. Roy Elsworthy, both of Nutfield Road, Leyton, who entered blazing stables, set alight by incendiary bombs, and saved 48 horses from being burnt to death.

ABSTRACTS

[RIBOFLAVIN DEFICIENCY IN POULTRY. Asplin, F. D. (1941.) *Vet. J.* **97.** 16-26. (4 photos on 2 plates, 36 refs.).]

It has been shown by American workers that eggs which are low in the riboflavin component of the vitamin B_2 complex have colourless whites and are of poor hatchability. Further, it is well recognised in the U.S.A. that growing chickens which are deprived of riboflavin exhibit poor growth and a leg weakness. The latter progresses until the affected birds are unable to lift their hocks from the ground and there is a characteristic inward flexion of the toes, from which the name " curled toe paralysis " has arisen.

There has been no previous published record in English veterinary literature of riboflavin deficiency in chickens. The author cites two personal observations which suggest that it does occur and may be of economic importance. In spring, 1940, consistently bad hatchability was experienced with the eggs from a flock of in-bred White Leghorn pullets. The chicks which did hatch (percentage hatchability was of the order of 20 per cent.) were small, and many did not dry properly ; leg weakness was prevalent, and in some cases developed into a characteristic " curled toe paralysis." A marked improvement in hatchability and in the health of the chicks produced was obtained when 4 per cent. brewers' yeast was added to the rations of the pullets. The addition of manganese was without beneficial effect and the percentage hatchability of untreated controls remained low.

During the same season a total of 32 other chickens exhibiting typical symptoms was obtained. Some were from a group of three to four weeks old birds which had received a commercial starter mash of unknown composition : the remainder of this group was fed 3 per cent. of added yeast, and further cases were not observed. Fourteen of the affected chickens were housed in solid floor pens and were provided with their original dietaries. Nine were treated with 507 riboflavin daily, and seven showed dramatic recovery. Two of the five untreated birds died, the others recovering spontaneously in about seven days. The *post-mortem* lesions in affected birds were essentially similar to those described by American workers. It was noted, however, that while the yellow discolouration of the nerves occurred in Cambar and White Leghorn chicks (yellow skinned birds) it did not occur in those of the white-skinned Light Sussex breed.

A. N. W.

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[A DISEASE OF CHICKS APPARENTLY IDENTICAL WITH NUTRITIONAL ENCEPHALOMALACIA. Asplin, F. D. (1940.) *Vet. J.* **96.** 449-452. (2 photos on 1 plate, 12 refs.).]

A disease apparently identical with that first produced experimentally by Goettsch and Pappenheimer (*J. exp. Med.*, 1931, **53.** 11) was recognised in three groups of chickens at Cambridge. Of a total of 112 birds, six only were affected. The ages of the affected birds ranged from three to five weeks.

The three groups were not in contact with one another, and the diets were different in each case.

Bacterial findings were negative, but transmission experiments were not carried out. The disease was sudden in onset, and all the affected chickens were in excellent condition. The first symptom was the use of the wings in running, and this was followed by a rapidly developing ataxia. In two cases death occurred within 24 hours. Macroscopically, the most prominent *post-mortem* lesion was an oedema and haemorrhage of the cerebellum. Histologically, a typical ischaemic necrosis was found; in some cases this involved the greater part of the brain, while in others it was restricted to a small area of a single cerebellar convolution. Oedema was a constant feature, and was most obvious at the junction of the molecular and granular layers of the cerebellum.

Nutritional encephalomalacia has been reported as being prevented by the addition of vitamin E to the basal diets on which it occurs, but as the author points out, it is difficult to understand how the usual poultry foods can be deficient in this vitamin.

A. N. W.

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[EQUINE COLIC. Rainey, W. (1939.) *J. S. Afr. vet. med. Ass.* **10**. 13-22. (3 refs.).]

The aetiology, prophylaxis and treatment of equine colic are discussed. It is suggested that general acceptance of the cause of the condition as a disordered reaction of ferment-secreting cells to adverse environmental influences will lead to the adoption of more rational treatment than hitherto. The empiric use of drenches of turpentine and linseed oil is condemned and the abandonment of arecoline and eserine on practical and humanitarian grounds is advocated. In the opinion of the author, about 85 per cent. of all cases of colic recover spontaneously. Treatment by passage of the stomach tube, administration of saline, injection of narcotics and judicious use of the trochar and cannula shortens the course of the disease but does not materially affect the casualty figure.

D. D. O.

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[STREPTOCOCCUS INFECTIONS IN DOGS. Minett, F. C., and Ellis, A. A. B. (1940.) *Vet. J.* **96**. 438-449.]

The authors record observations on the infection of dogs with haemolytic streptococci. Particular reference is made to genital infection in bitches and ensuing mortality in pups. Most of the streptococci isolated belonged to Lancefield's serological group G, a few to group C. The organisms were isolated from the vagina, prepuce, tonsils, from certain skin lesions and from the dead pups. In two cases haemolytic streptococci were recovered from the milk of infected bitches. Treatment of infected bitches, using sulphanilamide and M & B 693, was unsuccessful. Possible lines of treatment and control are discussed.

A. A. B. E.

Weekly Wisdom

To live content with small means; to seek elegance rather than luxury, and refinement rather than fashion; to study hard, think quietly, talk gently, act frankly; to listen to stars and birds, babes and sages, with open heart; to bear all cheerfully, do all bravely; await occasions, hurry never; in a word, to let the spiritual, unbidden and unconscious, grow up through the common. This is to be my symphony.—Wm. Henry Channing.

REVIEW

[THE PRINCIPLES AND PRACTICE OF FEEDING FARM ANIMALS. By E. T. Halnan and F. H. Garner. Published by Longmans, Green & Co. Price 15s.]

At the present time any book which gives useful practical advice upon the feeding of farm stock is to be welcomed, particularly if such a book also adds a special chapter dealing with feeding in war-time. The difficulties facing farmers at the present time due to limited quantities of feeding materials of restricted choice are great and in order to make the best use of the available foodstuffs and to ensure the satisfaction of the full needs of the producing animal, a knowledge of the constitution of the feeding materials and of the principles governing adequate dietaries is essential.

The present volume produced by Messrs. Halnan and Garner is an admirable book well suited to meet these needs. It not only gives practical details about the majority of feeding materials available in Great Britain but it also explains fully the principles of proper feeding and gives details as to how a balanced diet may be worked out.

On the whole the book is written in simple language and should be readily understood by the more educated farmer, but in the reviewer's opinion it might have been better to introduce the text with the first three chapters of Section B dealing with some of the practical aspects concerning food rather than to go straight into the theoretical considerations outlined in Section A. The present arrangement may tend to put the farmer against the book by giving him too much theory at the outset.

Biological values of feeding-stuffs and feeding standards are gone into thoroughly in the section on theoretical considerations and in the section dealing with practical considerations, chapters are devoted to the feeding of rearing cattle, dairy cows, fattening cattle, sheep, pigs, horses and poultry. The last chapter is devoted to feeding in war-time and this is followed by most useful appendices giving the composition and nutritive value of very many feeding stuffs. Altogether the book is well supplied with tables giving information of the utmost value in working out a balanced diet.

The attractiveness of the book is increased by the inclusion of a few excellent photographs dealing with various farm operations. This section might usefully have been increased.

There are a few minor errors which need not be discussed and the text is a little inadequate in its references to diet and disease and not entirely accurate, but the main purpose of the book is fully achieved.

At the present time when the profession is devoting more attention to the maintenance of health of farm stock and to the giving of such advice to farmers, it is imperative that the practising veterinary surgeon should have quite adequate knowledge of the principles and practice of feeding farm animals. The volume under review can very materially assist the practising veterinary surgeon and the reviewer confidently recommends it to the profession. The book could not have been published at a more opportune moment either for the farmer or for the veterinary surgeon.

NOTES AND NEWS

The Editor will be glad to receive items of professional interest for inclusion in these columns.

War Damage Insurance

The War Damage (Business Scheme) Order, 1941, made by the Board of Trade under Part II of the War Damage Act, became operative on April 17th. As the scheme is of interest and, in many cases, of great importance to members, we give below a résumé of the Order, the compulsory obligations it imposes, and the voluntary privileges it allows. Members should seek advice and insurance either from the insurance agent through whom their ordinary fire business is placed, or from the Insurance Brokers and Advisers to the N.V.M.A., Messrs. S. H. Cannon & Co., Ltd., who have been appointed Agents to the Board of Trade for the purpose of administration of the scheme. All correspondence relating to it should be addressed to them as follows: S. H. Cannon & Co., Ltd., War Damage Department, 24, Oaklands, Argyle Road, London, W.13.

The matter is one of urgency, as insurance must be effected within 30 days of the date when the scheme came into force. It must be emphasised that no application for insurance can be dealt with unless accompanied by a remittance for the appropriate premium (the regulations compel the deposition of both the application form and the remittance at the same time) and no cover is effective until both are received.

Under the "Business Scheme" where the total value of all business equipment, plant, furnishing materials, office equipment and the like does not exceed £100 in value, there is a special clause which permits such goods incidental to the insured business or profession to be included under the "Private Chattels Scheme"—a method of insurance which may be preferred by some members, so that they need have only one policy to cover both their private and domestic effects in addition to their professional stores, equipment, instruments, etc.

Summary of Provisions

General.—As previously stated, in order that cover may be secured under the "Business Scheme" insurance must be effected within 30 days from April 17th (during the month of May under the "Private Chattels Scheme").

The War Damage Act, 1941, also provides for those cases in which the damage occurred before the schemes came into force. If the property has sustained war damage at any time between September 3rd, 1939, and the date of coming into force of this scheme, the insured will be treated as if he had a policy under the scheme and he will receive the same compensation as he would have received in that case. A sum will be deducted from his compensation to cover any premium which he would have paid if the scheme had been in force.

In general, payment will be deferred until after the war and interest at 2½ per cent. a year will accrue from the date of the damage on the amount due, but will not be paid until final settlement. In the following cases earlier payment (in whole or in part) may be made: under the "Business Scheme," if the total amount of the claim does not exceed £100 *or* the Board of Trade are satisfied that the replacement or repair of the goods is expedient in the public interest; under the "Private Chattels Scheme," if the total amount of the claim does not exceed £25 *or* the Board of Trade are satisfied that the payment in whole or in part should be made to avoid undue hardship.

The "Business Scheme."—This scheme covers plant and machinery and business equipment.

The rate of premium for the whole period from the beginning of the war to September 30th, 1941, is 30s. per cent. and three policies, at 10s. per cent. each, will be issued to cover three periods ending June 15th, August 15th, and September 30th, 1941, respectively. There is a minimum premium of 10s.

It is an offence for the owner of goods insurable under the "Business Scheme" which are worth more than £1,000, not to insure them, but he may insure goods of this class if they are worth that sum or less, should he so desire.

Generally speaking, insurance is compulsory only if one owns the goods or has to replace them should they be destroyed by enemy action.

The Act requires insurance for the full value. Owners would be well advised to insure for what it would cost to replace the goods at the time of the loss, less a reasonable amount for depreciation. It is necessary to allow for depreciation because the Government cannot be expected to supply new equipment for old.

Professional people come under the "Business Scheme," but only in respect of their professional equipment. For instance a dentist's apparatus would be insurable under the "Business Scheme" as well as the furniture used in his professional capacity. His other chattels will be insurable under the "Private Chattels Scheme."

Goods normally used and situated in an evacuation area for the purposes of the Defence (Evacuated Areas) Regulations, 1940, are voluntarily insurable.

Among the items of equipment also voluntarily insurable under the "Business Scheme" are objects of scientific interest, books and printed publications more than 50 years old, and manuscripts, radium and compounds thereof.

Where the value of the business equipment does not exceed £100, it will be insurable under the "Private Chattels Scheme."

If his premises are bombed, the insured should notify his agent at once. The latter will supply a claims form which should be sent in within 30 days. The matter of payment is as dealt with under "General."

"Private Chattels Scheme."—There will be free compensation for householders (without payment of premium) for furniture, clothing and other personal effects up to the limits which are given below. Beyond those limits one will, by paying a premium, be able to insure for any amount up to £10,000.

The free compensation for householders is as follows: £200 with an extra £100 if he is married and has his wife living with him and an extra £25 for every child under 16; every other adult person who is not a householder will get free compensation up to £50.

On the articles specified in the Order, cover is limited to £100 in the aggregate or 20 per cent. of the total sum covered by the policy, whichever is the greater.

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N.V.M.A. WATCH COMPETITION FOR BENEVOLENCE

Members are urgently requested to make a very special effort between now and the end of June to aid the Association's endeavour, by means of the Watch Competition, and assist the benevolent funds of the profession. Please see that the cards in your possession are completed, and write for more without delay. Applications for further cards will be heartily welcomed by the General Secretary at 10, Bore Street, Lichfield.

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AIR RAID DAMAGE AT RED LION SQUARE

Members of the profession will be sorry to learn that in the "blitzkrieg" on the night of Wednesday of last week, the Royal College of Veterinary Surgeons' premises at Nos. 9 and 10, Red Lion Square suffered material, if happily superficial, damage. Fortunately the structural injury would appear to be slight, in strong contrast to much of that in the surrounding neighbourhood, a particularly regrettable feature of which is the utter ruin of the fine church on the west side of the square.

The stained glass windows of the Council Chamber have been smashed and the majority of the windows and

ceilings in both houses have been severely damaged, but although the library, as seen the following morning, presented a sorry spectacle, with piles of broken glass and fallen plaster, it would seem that the books have not suffered. Similar damage has been done to the caretaker's flat below, but we are glad to say that they are unhurt and, with Miss Raymer, the Assistant Librarian, have now restored order out of the chaos which prevailed.

It is satisfactory to know that the portraits of Past Presidents, R.C.V.S., and other worthies, together with works and manuscripts of special value, have previously been removed to safe quarters at Compton; also that the evacuation measures taken by the Councils of the Royal College and the N.V.M.A. have again been proved, by sad circumstance, to be wholly justified.

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R.C.V.S. OBITUARY

Forsdyke, Frederick Walewski, Colonel A.V.S. (retd.), Devonia, Belle Vue Road, Paignton, S. Devon. Graduated London, January 8th, 1878. Died March 3rd, 1941; aged 83 years.

Larnder, Eugene William, C.B.E., Colonel A.V.S. (retd.), late of Croy Lodge, Paignton. Graduated London, July 5th, 1887. Died, April 13th, 1941; aged 77 years.

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Colonel E. W. Larnder, C.B.E., M.R.C.V.S.

A Distinguished Army Veterinarian

Colonel Larnder, whose death we record above with much regret, had a remarkable and distinguished career in the Army Veterinary Service.

At the early age of 20 he served in Methuen's Horse during Sir Charles Warren's peaceful expedition to Bechuanaland which preserved that territory from Boer domination. He received his first commission, as Lieutenant, in the Army Veterinary Department in 1888, and was in India from 1889 to 1896, being appointed Assistant Principal at the Veterinary College, Bombay, in August, 1894. *The Times* records how, at Capetown in June, 1897, he assisted the second officer of H.M. transport Dilwara to rescue a fireman who had fallen overboard. In almost pitch darkness he let himself down by a rope into deep water, shark-infested, and for his share in bringing the man ashore successfully was awarded the Royal Humane Society's testimonial on vellum.

The notice proceeds: "In November, 1898, he was promoted Captain, and during the South African War took part in the operations for the relief of Ladysmith as Senior Veterinary Officer of the 2nd Division. He was present at the Battle of Colenso and the actions of Spion Kop, Vaal Krantz, Tugela Heights, and Pieter's Hill; and after the siege had been raised in March, 1900, he was at Laing's Nek during the advance through northern Natal and then served in the Transvaal until February, 1901. He reached the rank of Major in the Army Veterinary Corps (as it had become) in November, 1903, and served again in South Africa from 1908 until 1910. In December of that year he was appointed Administrative Veterinary Officer Irish Command, and then Assistant Director of Veterinary Services at the Curragh until October, 1912.

"During the last War he was A.D.V.S. Northern Command from December, 1915, until August, 1916, and then went to Salonika as A.D.V.S. at British G.H.Q. At the end of May, 1917, however, he was transferred to the Western Front, where he was D.D.V.S. Lines of Communication (Northern Section) until February, 1918. He then went to the First Army in the same capacity. He was mentioned in despatches and, after the Armistice, he went to India, where, in May, 1919, he took up the appointment of D.D.V.S. Southern Command. For his services during the Third Afghan War he was created C.B.E. and again 'mentioned.'"

Colonel Larnder married Mary, daughter of Dr. John Broke Marshall, in 1889. His wife died in 1936, and he lost his only son in the War, killed in action in 1917. Two daughters survive, and we extend deep sympathy to them in their bereavement.

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U.S.A. REMOUNT SERVICE PURCHASES

Striking evidence that American military authorities regard the horse as likely to be of continued use in war is furnished by the news that the United States Army Remount Service, as part of the National Defence Programme, has just bought 20,000 horses and expects to purchase an additional 7,000.

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UNITED STATES MEDICAL MEN FOR BRITAIN

Mr. Roosevelt, in response to a telegram sent to the American Red Cross, of which he is President, has appealed for 1,000 young American doctors to volunteer to serve with the R.A.M.C. and the Civilian Emergency Medical Service. The telegram, which was sent by Field-Marshal Sir Philip Chetwode, Chairman of the British Red Cross, was as follows:—

"The British Red Cross sends an appeal to her sister society in America to supply up to 1,000 medical practitioners under conditions already specified and accepted by you.

"These doctors are required to assist both the military and civilian medical services of his Britannic Majesty's Government in the humanitarian work which is being performed in the United Kingdom and in all theatres of activity. The demand is urgent and the conditions of service good.

"The British Red Cross will be highly appreciative of the assistance and support of the American Red Cross in this task."

In a statement issued in Washington Mr. Norman H. Davis, Chairman of the American Red Cross, said that his organisation had agreed to help in the project, which had the approval of the President of the United States, the Secretary of War, and the Surgeon-General of the Army and Navy, as well as of the Surgeon-General of the United States Public Health Service.

The American Red Cross would have the co-operation of the Division of Medical Sciences of the National Research Council, the American Medical Association, the American College of Physicians, and the American College of Surgeons, to representatives of which bodies the qualifications of applicants would be submitted. "We are confident the response from the medical profession will be splendid," Mr. Davis said.

Parity with British Doctors

For service with the R.A.M.C. the British Red Cross has asked for male American doctors under 40 years of age. Doctors up to 45 years will be taken for Emergency Medical Service. Applicants will be asked to serve for a minimum of one year, and will retain their status as American citizens.

The reasons for this step were explained in more detail at a Press conference in London. Dr. J. E. Gordon, American Liaison Officer at the Ministry of Health, said that he felt sure of the welcome that the American volunteers would receive from their British colleagues. They would be incorporated in the actively functioning medical service of this country and given British registration and parity with British medical men.

Dr. G. C. Anderson, Secretary of the B.M.A. and of the Central Medical War Committee, said that for some time after the war began we had relied on volunteers for medical work, until the time came when competing claims on doctors' services made it necessary to apply compulsion to the medical profession, as to the rest of the community. Dr. Anderson pointed out how vastly greater were the demands on medical services to-day than in the last War. The time had now arrived when they felt they were endangering the civil population to an undue degree unless they got help from elsewhere. That was why they had now appealed to America.

RED CROSS AGRICULTURE FUND

The total expenditure of the Red Cross and St. John War Organisation to March 5th was £4,157,000, some of the main items being as follows: General and Medical Stores, £1,080,000; Prisoners of War (Food and Comforts), £1,475,000; Ambulances, X-ray Units, etc., £225,000; Commissions Overseas, £163,000; Convalescent Homes for Officers and Other Ranks (less amounts received), £164,000.

With the extension of the war in the Middle East it is obvious that the calls upon the Red Cross will become increasingly heavy, and it is hoped that the farming and kindred communities, through the Red Cross Agriculture Fund, will continue to give substantial help to this work on behalf of the sick and wounded, prisoners of war, and victims of air raids.

Northern Ireland is to have its Red Cross Agriculture Fund Committee. Lord Glentoran, the Minister of Agriculture, is arranging for a meeting of farmers and ancillary industries, when it is hoped a committee thoroughly representative of the industry will be formed.

In England and Wales, all interests have combined to raise over £500,000 for the Red Cross Agriculture Fund.

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SUMMER RATIONS FOR LIVESTOCK

Livestock rations for May, June and July are to be drastically cut. Announcing this, the Ministry of Agriculture said that there will be very little to spare, and every effort must be made to build up a reserve of high protein foods for next winter.

The supply position is such that all classes of livestock, except pigs and poultry, will have to depend this summer mainly, if not wholly, on grazing for maintenance and production.

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MINISTRY OF AGRICULTURE NEWS SERVICE

Farmer Claims Healthier Stock from Home-grown Food.—A Lanarkshire farmer has been speaking of his new methods for the Scottish Department of Agriculture and it is interesting to find him insisting that rationing for cattle "may even be a blessing in disguise" for farmers. He points out that he has learnt to produce more of his own feeding-stuffs to replace the concentrates he used to buy in what he now considers "excessive quantities." He maintains that his cattle are now healthier on their diet of grass, oats, hay and roots, "since the digestion of rich protein foods in excess of normal requirements overtaxes, or puts a strain on, the animal's digestive system."

This Scottish farmer, with 40 Ayrshire cows and 38 young cattle, is meeting the feeding-stuffs problem by putting more of his land under oats and swedes. He has thus become almost independent of bought feeding-stuffs. His cows are getting 20 lb. of swedes, 12 lb. of hay, 6 lb. of straw and 3 lb. of crushed oats per day. The young cattle are allowed 1½ lb. of concentrates daily.

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Livestock and Home-grown Wheat.—Millable wheat may no longer be fed to livestock by those who have grown it. It must be sold to an approved buyer. The one exception to this is wheat used for seed on the farm where it is grown. Approved buyers, who may be millers or merchants, will only be permitted to use or sell home-grown millable wheat for flour milling or seed, and this restriction applies to any stock in their possession. Farmers who wish to buy seed wheat for sowing must sign an undertaking that the wheat will only be used for this purpose and must get the undertaking countersigned by their County War Agricultural Executive Committee.

Some poultry keepers, or licensed dealers in feeding-stuffs other than approved buyers of wheat, have bought home-grown millable wheat for poultry feeding. They may use or sell such wheat in their possession for that purpose; and wheat growers with not more than 10 cwt. of millable wheat of their own growing may feed it to their own poultry.

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Dried Potato Products.—Good supplies of dried potato products for feeding to livestock are now available. The price is £11 per ton, compared with £16 15s. 0d. per ton for barley meal. Farmers might well consider putting orders through their merchants for this home-produced feeding-stuff in exchange for their cereal coupons. On feeding value the price seems very reasonable.

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LINSEED POISONING OF CALVES

[Contributed]

In view of the fact that many farmers are now growing their own linseed, it is opportune to call attention to certain precautions which must be observed in the use of this food for young stock. Linseed and linseed products, such as linseed cake and linseed cake meal, have long been highly esteemed on account of their outstanding virtues, and many thousands of tons are annually fed to farm stock. Nevertheless, all linseed cake and linseed products are capable of generating prussic acid unless certain precautions are taken when they are fed. Poisoning in calves still occurs from time to time, and it would appear that some farmers, though no doubt familiar with these precautions, do not realise the risks run by not adopting them. The poisoning is not due to any fault or abnormality in the cake or meal, but to the way in which it is fed. Linseed products do not in themselves contain prussic acid, but generate it if they are mixed with cold or tepid water. Boiling prevents the chemical action which generates the prussic acid, and the foods are then quite harmless. Neither can the poison be liberated, except in very small amounts, if the foods are fed dry, as the secretions of the digestive tract prevent its formation inside the animal. There is no danger from linseed or any linseed product from prussic acid poisoning if they are fed dry; and this is the best method of feeding linseed cake and linseed cake meal except, in certain cases, to very young calves. Linseed and ground linseed (as distinct from linseed cake and linseed cake meal) increase greatly in volume when water is added to them, and it is therefore customary to feed these wet to calves. If fed wet, linseed, ground linseed, linseed cake, and linseed cake meal must all be boiled vigorously to make them safe to feed to calves. It is not enough merely to add boiling water to them. Lack of this precaution may result in serious loss.

In a recent Court case where prussic acid poisoning was exhaustively examined, the judge in his summing up made it clear that it was wrong and misleading to say that linseed cake contains prussic acid. It is capable of producing prussic acid under certain conditions, which is quite another matter. This remark is true of linseed also. He further stated that "every linseed cake possesses latent possibilities of developing hydrocyanic (prussic) acid. This is not due to bad or negligent manufacture, but is the nature of the seed itself."

For those interested in the more technical side we may say that linseed and linseed products all contain a cyanogenetic glucoside (phaseolunatin) and an enzyme. So long as these two factors remain inoperative they are harmless, but in the presence of water they interact and produce hydrocyanic acid. Boiling dissociates the enzyme and makes the interaction impossible. The reason why it does not take place after the food is moistened during the process of ingestion by the animal except to a very limited extent is that the action only occurs freely in a neutral or almost neutral solution, whereas the fluids of the alimentary tract are either distinctly acid or, in certain areas, alkaline, but not neutral. The presence of glucose, fibre and cellulose materials also limit the action. Any small amounts of the acid liberated in the digestive tract are immediately eliminated by the animal without harm, and there is no cumulative effect. Serious effects can only occur when the acid has been produced by the addition of water before the linseed is eaten by the animal, which thus receives a full dose which cannot be evaporated in time to avoid injury.

CORRESPONDENCE

Letters to the Editor should reach the Office not later than by the first post on Tuesday morning for insertion in following Saturday's issue.

The views expressed in letters addressed to the Editor represent the personal view of the writer only and must not be taken as expressing the opinion or having received the approval of the N.V.M.A.

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"MAKE FRUITFUL THE LIVESTOCK"

To the Editor of the Veterinary Record

Sir,—The Survey Committee's report and the ensuing discussion have dealt almost exclusively with the most pressing problems that call for solution by our profession at the moment. Much impressed by a recent pamphlet[1] published by an agricultural scientist of outstanding eminence, Sir George Stapledon, entitled "Make Fruitful the Land," the present writer ventures the opinion that a much larger view is now demanded than has prevailed generally in the mind of the veterinary profession. To quote Sir George Stapledon: "The truth is that unless, here and now, we do in all earnestness set about the rehabilitation of rural Britain—we cannot hope to do anything of startling magnitude in the way of war-time food production." To conceive and operate a good short-term policy to meet the dire needs of the present he maintains that we must be constantly planning for and dreaming of the future. Granted a long-term agricultural policy coupled with good farming he believes that the gap in our current needs in animal feeding-stuffs, that has hitherto had to be filled by importation, could be largely closed; and we could still produce greatly increased quantities of potatoes and wheat. He rightly contends that after the present war, with a half-starved Europe, disorganised shipping, and industrialised dominions, this country may be largely thrown on its own resources for food production.

In the submission of the present writer, the time is now opportune for our profession to exert all its endeavours in no small measure to "Make Fruitful the Livestock" of this country. To this end, it is evident that in the first place we must strive to equip ourselves with all the necessary knowledge and gain the experience required for the work. Hefe and now, therefore, we ought to press for far-reaching changes in the teaching and organisation of our profession. The writer realises that, but for the misfortune of the present war, advocacy of such changes, for which the profession owes an incalculable debt of gratitude to your journal, would not have been suspended.

To take a much larger view of our prospects than is implied in the successful launching of the Survey Scheme—indeed, to envisage the whole future success of veterinary science—a two-fold problem presents itself: firstly, to increase the quota of information which the research worker can place at the disposal of the veterinary practitioner; and, secondly, to increase the competence of the veterinary practitioner to implement this information.

At the present time there is a tendency for more and more research to be executed under direct Government control at specialised institutions. The dangers of excessive Government control of research have been stressed in a recent address by a distinguished authority in the person of Dr. A. V. Hill.[2] Briefly, his views are the following: Stagnation and complacency tend to develop in such State institutions and there is a danger that science will become reduced in them to an official routine. Research may be devoted to objects which the politician or civil servant regards as of national importance for the moment and there is a danger that it will be planned by administrators in offices instead of by enterprising young men imbued with the spirit of pioneers in laboratories or workshops. The separation of teaching from research is a great disadvantage. This last aspect of the problem, together with the training of research workers, has been also dealt with by Professor Topley.[3]

It is not suggested that all Civil servants and all Government departments are endowed in the extreme with the disability of exerting the above baneful influence on the progress of research. The tendency, however, must be admitted to be a grave one. It can only be overcome if free rein is given to well-informed criticism. The growth of veterinary research under direct Government control is a development that is, therefore, not wholly to be deplored. It is contended strongly, however, that this development is one that ought to be accompanied by a corresponding strengthening of the veterinary colleges. For it is at the veterinary colleges that should prevail the atmosphere required for liberal criticism and independence in research. Largely through lack of funds the colleges now seem to continue their work under great difficulties. Because of the competing attractions of better equipped institutions the colleges will soon cease to attract or retain on their staffs the most gifted men capable of inspiring teaching.

To promote a healthy and vigorous growth in veterinary research, and in adequate manner to teach veterinary students, the facilities for research and teaching at the veterinary colleges ought, therefore, to be greatly extended. A new importance must be attached to clinical teaching of certain aspects of veterinary work which in the past have been woefully neglected, such as, for example, the reproductive disorders of farm animals. In the basic training of the student, there must be again to this end a new importance attached particularly to the subject of animal physiology and to all aspects of animal husbandry. It is only by the application of the knowledge that we ought to possess in these subjects that we can play a worthy part in livestock production.

Any future schemes of investigation, in animal husbandry or disease control, ought, it is felt, to be linked in as close a manner as is possible, with the activities of the veterinary colleges. It is hoped that Veterinary Investigation Officers will come to occupy an important place in the work of the Survey Scheme when it reaches fruition and that their numbers will be greatly increased. The most appropriate base from which the Veterinary Investigation Officer should operate is, in the view of the present writer, a veterinary college. The officer at such location would be able to draw on the knowledge of his colleagues and in turn provide them with themes and materials for investigation. His experience and knowledge could not but be beneficial to the student. At present it is distressing to contemplate the paucity of first-hand knowledge placed within the reach of the veterinary student.

From the writer's vivid recollection of present deficiencies in training through having recently passed through a veterinary college there are, in his submission, changes in the curriculum that could and ought to be made immediately. Far less attention need now be paid to the anatomy, medicine and surgery of the horse and dog. Far more attention ought to be paid to preventive medicine and animal husbandry as affecting the food animals, particularly the cow. The interest of the student in animal nutrition and genetics should be sustained during the final two years of the curriculum. It is essential that the course in physiology should cover two years, of which the second year should be devoted to the applied physiology of the domesticated animals, and stress be given to the special physiology of the digestive system and reproductive systems of the food animals. These subjects ought to be taught by none other than men who have devoted themselves to their special study, and students ought to be examined afterwards by none other than men who are fully conversant with recent developments in the subjects. To obtain an insight into agricultural methods, which cannot be obtained by merely "seeing practice" students should be compelled to spend at least six months working on a farm.

Long ago, Sir John M'Fadyean, to his credit, emphasised that the progress of veterinary science must in the first place depend upon the training of the veterinary student. It is on our insistence upon the fundamental importance of this matter of the training of the student that will come to depend our professional ability to effect

some amelioration in the country's livestock production and ultimately it will be the vindication for the continued existence of the veterinary profession itself. In our war-time planning, therefore, we must press for the changes advocated with all our endeavour.

Yours faithfully,

The Research Station, JOHN FRANCIS.
Pirbright, Surrey.
April 17th, 1941.

[1] "Make Fruitful the Land! A Policy for Agriculture." Sir R. George Stapledon. pp. 63. Kegan Paul, 1941.
[2] *Vet. Rec.* (1941.) **53**. 141.
[3] *Lancet*. (1938.) ii. 6014.

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CONTROL OF DISEASES OF LIVESTOCK

To the Editor of the Veterinary Record

Sir,—It appears that there is a great difference of opinion as to the efficacy of methods of control as outlined in the Survey Committee's Report, but the consensus seems to be that, in a short-time policy at least, we as a profession should be rash if we gave it to be understood that by the introduction of the scheme, as it stands, we can do much to lighten the losses caused by the diseases mentioned. I think that this applies particularly to abortion and Johne's disease.

As to the former: until the suggested attenuated vaccine has been standardised and well tried in the field let us be very wary of prophesying successful results. We *hope* the method will be successful, but results in any case cannot be achieved until the treated calves come, or should come, into milk.

Johne's disease in my practice is not now a serious matter for consideration. I think that routine inspection of herds has helped greatly to reduce this disease.

Mastitis can undoubtedly be controlled to a certain extent by infusion of the udder, but here again we must not be too boastful.

As regards sterility, I am surprised that the treatment of this condition has, apparently, not met with more success. I have treated the condition with considerable success for some years. I, contrary to Mr. Bugg, can say to a client, "This treatment should do the trick."

In my opinion the only useful purpose that the suggested scheme could serve would be to advertise the fact that good can be done in cases of sterility, and then let us look to it that we do not bring discredit upon our profession by launching out on a treatment quickly taught and inadequately understood.

It seems to me that the whole matter has been brought up by a lot of wishful thinking on the part of a section, and I think only a small section, of our calling. Let us beware.

Yours faithfully,

Camden House, T. J. MARGARSON.
London Road,
Stroud, Glos.
April 13th, 1941.

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A FOETAL RARITY

To the Editor of the Veterinary Record

Sir,—It was with great interest that I read the clinical communication, by Mr. Smythe, of Camborne, in today's *Veterinary Record*. Forty-five years ago, when I was Assistant to the late Mr. W. L. Weighill, of Gloucester, I was called out to a similar case, the cow belonging to the late Mr. Pocock, of Twigworth Court, near Gloucester—a fine old type of English gentleman farmer.

On examining the animal, I produced the heart of the calf. He laughed heartily and said, "that's nonsense!" I then pulled out its bowels, lungs, etc. I now had a large smooth round ball to deal with. Puncturing this on both sides, I passed a blunt hook, with a thin calving rope attached, right through the mass, well lubricated the passage, and got it away with little trouble. The calf was inside-out, and on opening the ball I found the hairy side of the skin, and the spine, in a circle, the tail touching the head.

My chief, on his return from a few days' leave, was most interested in the case and said I might live long and never see another like it. I believe I have heard of one or two similar cases since then, but they are very rare.

Yours faithfully,

JAMES ROBERTSON.

Stourbridge, Worcs.
April 19th, 1941.

DISEASES OF ANIMALS ACTS, 1894 TO 1937, AND AGRICULTURE ACT OF 1937 (PART IV)

Summary of Returns of Confirmed Outbreaks of Scheduled (Notifiable) Diseases

Period.	Anthrax.		Foot-and-Mouth Disease.		Parasitic§ Mange.		Sheep Scab.	Swine Fever.	
	Outbreaks confirmed.	Animals attacked.	Outbreaks confirmed.	Animals slaughtered as diseased or exposed to infection.	Outbreaks confirmed.	Animals attacked.	Outbreaks confirmed.	Outbreaks confirmed.	Swine slaughtered.
	No.	No.	No.	No.	No.	No.	No.	No.	No.
Period 1st to 15th March, 1941	24	24	38	3,127	1	1	5	66	22
Corresponding period in									
1940	25	25	2	61	—	6	8	131	92
1939	31	33	3	217	3	8	10	68	38
1938	44	45	2	100	2	8	9	16	6
Total 1st January to 15th March 1941	112	120	115	11,977	5	12	79	506	233
Corresponding period in									
1940	129	141	14	2,242	8	21	82	789	441
1939	208	220	29	4 357	17	33	129	277	172
1938	215	222	103	14,659	27	42	75	82	33

NOTE.—The figures for the current year are approximate only.

§Excluding outbreaks in Army Horses.